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10/544,272	05/09/2006	Aimo Jarvinen	4819-4748	8669
27123 7590 05/30/2008 MORGAN & FINNEGAN, L.L.P. 3 WORLD FINANCIAL CENTER NEW YORK, NY 10281-2101				
EXAMINER				
SHEVIN, MARK L				
ART UNIT		PAPER NUMBER		
1793				
NOTIFICATION DATE		DELIVERY MODE		
05/30/2008		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOPatentCommunications@Morganfinnegan.com

Shopkins@Morganfinnegan.com

jmedina@Morganfinnegan.com

# Office Action Summary

**Application No.**

10/544,272

**Applicant(s)**

JARVINEN ET AL.

**Examiner**

Mark L. Shevin

**Art Unit**

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 August 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SE-08)
- Paper No(s)/Mail Date 08/03/2005
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_

## **DETAILED ACTION**

### ***Status***

1. Claims 1-14, filed as a preliminary amendment on August 3rd, 2005, are pending.

### ***Priority***

2. Applicants have claimed benefit of Finnish patent application, 20030285, filed February 26th, 2003, and this has been recorded.

### ***Information Disclosure Statement***

3. The information disclosure statement (IDS) submitted August 3<sup>rd</sup>, 2005 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement and has been considered by the examiner. Please refer to applicants' copy of the 1449 submitted herewith.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. **Claims 1 and 7** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Davister** (US 4,252,775) in view of **Fugleberg** (US 6,340,450).

Davister:

Davister, drawn to a process of treating iron-bearing zinc ores (Abstract), teaches that from a review of the relevant zinc hydrometallurgy prior art, leaching should be closed circuit, have increasing acid content in the form of a multistage countercurrent leaching, be conducted at atmospheric pressure and moderate temperatures (col. 1, lines 22 to col. 2, line 7).

Zinc is roasted to form a calcine (col. 8, line 26 and col. 9, line 20) and subjected to a neutral leach with using a portion of spent acid from zinc electrowinning (col. 8, lines 25-38).

The neutral slurry is thickened through decantation and the zinc-rich solution is feed to electrowinning for the recovery of zinc (col. 8, lines 45-65).

The leachate is then submitted to further leaching in three countercurrent stages where the temperature is maintained between about 85 and 100 °C (col. 9, lines 4-10). In the second countercurrent leaching stage, jarosite is precipitated and separated in accordance with known techniques (col. 9, lines 20-32). The acid concentration increases from the first stage to the third and final stage and the acid limits should be selected with consideration to the iron and silica contents (col. 7, lines 44-58). Solid liquid separation in the form of thickening through settling is performed at the end of each stage and these steps are important for obtaining good results (col. 7, lines 4-13).

All the dissolved iron collected in the acidic sulphate solution is precipitated and the solution neutralized, which eliminates all of the iron from the solution together with harmful minerals including arsenic, antimony, and germanium while the zinc-rich sulphate solution is recycled ahead in the leaching process where the acidity and iron content of the solution are the lowest (col. 1, line 65 to col. 2, line 8).

Davister teaches that zinc loss in the residue is nearly eliminated (col. 5, lines 20-25) and that a large reduction in the quantity of fresh sulfuric acid needed in the leaching process is achieved and that this is beneficial as it minimizes zinc values loss in drawn off zinc sulfate solution (col. 11, lines 6-18).

Davister does not specifically teach recovering zinc from a mixture of both zinc calcine and zinc sulphide concentrate.

Fugleberg

Fugleberg, drawn to method for leaching zinc concentrate in atmospheric conditions (Abstract), suggests that both zinc sulphide concentrate and zinc calcine are used in neutral leaching with added oxygen as Fugleberg teaches that the oxygen would not be necessary if the zinc with only in calcine (oxidized form) (col. 4, lines 5-12).

Regarding claim 1, it would have been obvious to one of ordinary skill in hydrometallurgy, at the time the invention was made, taking the disclosures of Davister and Fugleberg as a whole, to recovery zinc in a three-stage countercurrent leaching process as claimed as Davister teaches a method of recovering zinc values from roasted zinc (calcine) using just such a three-stage countercurrent leaching process,

Art Unit: 1793

performed at in the claimed temperature and pressure range and where the jarosite precipitates in the second stage as explained above. Fugleberg shows that both zinc calcine and zinc sulphide concentrate are used in zinc recovery and furthermore one would reasonably expect both reagents to be used as zinc roasting is inherently not 100% efficiency as thus at least some zinc will not be oxidized (also evidenced by the presence of ferrite).

Regarding claim 7, Davister teaches that zinc is roasted to form a calcine (col. 8, line 26 and col. 9, line 20) and subjected to a neutral leach with using a portion of spent acid from zinc electrowinning (col. 8, lines 25-38) along with recycled acidic solution (contains zinc sulphate and iron sulphates) from thickeners at the jarosite precipitate and concentrate leaching stages.

5. Claims 2-6 and 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Davister** in view of **Fugleberg** as applied to claim 1 above, in further view of **WO '481**.

The disclosures of Davister and Fugleberg were discussed above, however neither reference explicitly teaches the pH value of the neutral leaching step.

**WO '481:**

WO '481, drawn to a method for the hydrolytic precipitation of iron from a sulphate solution as jarosite (Abstract), teaches that in industrial zinc oxide neutral leaching, the leaching is carried out in a pH range between 2 and 5 (p. 1, lines 25-30).

Regarding claim 2, it would have been obvious to one of ordinary skill in hydrometallurgy, at the time the invention was made, taking the disclosures of Davister,

Art Unit: 1793

Fugleberg, and WO '481 as a whole, to incorporate the pH to be used in the neutral leaching step of WO '481 as Davister teaches that the primary leaching is performed in accordance with known techniques (col. 8, lines 65-70).

Regarding claims 3 and 4, Fugleberg teaches that the sulfuric acid content in the leaching step should be within the region 10-40 g/l and WO '481 demonstrates in Example 1 (p. 7, lines 15-32) successful iron precipitation (second stage) with an sulfuric acid content of 10 g/l and suggests that the results could be improved with an even lower sulfuric acid content (higher pH, p. 8, lines 1-5). It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Regarding claims 5 and 6, Fugleberg teaches that the sulfuric acid content in the leaching step should be within the region 10-40 g/l and WO '481 teaches that ferrite leaching should be performed when the acid content is between 30 - 100 g/l (p. 1, lines 25-30). It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In

re Boesch, 205 USPQ 215 (CCPA 1980). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Regarding claims 10-12, Davister teaches the precipitation of jarosite in the concentrate leaching and jarosite precipitation stage is performed in accordance with known technique (col. 9, lines 30-32) and WO '481 teaches the precipitation of jarosite by feeding oxygen and alkali ions such as sodium, potassium or ammonium in addition to jarosite nuclei to a sulphate solution (p. 3, lines 20-29) This process is carried out using return acid (p. 4, lines 30-32).

Regarding claim 13, Fugleberg teaches feeding solids left over from concentration leaching and jarosite precipitation stage, which contain ferrites to a conversion stage that utilizes oxygen and return acid from electrolysis to leach ferrites and end concentrate and precipitate iron as jarosite (col. 3, lines 23-37 and Fig. 1).

Regarding claim 14, Fugleberg teaches that it is well-known to separate a final elemental sulphur and undissolved sulfide concentration by means of flotation (col. 1, lines 64-67).

**6. Claims 8 and 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Davister** in view of **Fugleberg** as applied to claims 1 and 7 above, in further view of **Reinhardt** (US 4,124,462) in view of **Graf** (G.G. Graf, Zinc, in *Ullmann's Encyclopedia of Industrial Chemistry*, June 15th, 2000, p. 1-24).

Davister taught the addition of air or oxygen into the neutral leaching solution to precipitate additional iron (col. 8, lines 38-45) and that antimony and germanium are



found in solid residues after leaching (col. 9, lines 4-10), however neither Davister nor Fugleberg specifically teach the addition of oxygen/air to oxidize ferrous iron and precipitate it as hydroxide  $\text{Fe}(\text{OH})_3$ , which co-precipitates with harmful minerals in the solution such as Ge and Sb.

#### Reinhardt

Reinhardt, drawn to a method of recovering zinc from a material containing zinc and iron (Abstract), teaches a neutral leaching step with zinc-containing material is leached with sulphuric acid so that the final pH is from 3 to about 5.5 to form zinc sulphate and iron in the form of undissolved hydroxide (col. 1, lines 45-68).

Divalent (ferrous) iron should be converted to trivalent (ferric) iron by blowing air or oxygen into the leaching solution during the leaching step (col. 2, lines 7-14).

#### Graf

Graf, drawn to a review of zinc and methods of recovering zinc, teaches that during neutral leaching using a mixture of cell acid (from electrolysis) and acidic solution from iron precipitation, iron, arsenic, antimony, and germanium are retained as solid residues (p. 13, col. 1, para 1). Divalent  $\text{Fe}(\text{II})$  ions are oxidized to trivalent  $\text{Fe}(\text{III})$  in the neutral leaching solution and iron is precipitated as its hydroxide by adding further calcine with this precipitation causing arsenic and germanium to be adsorptively co-precipitated (p. 13, col. 1, para 2).

Graf further teaches why it is so important to remove impurities such as antimony and germanium as early as possible as these impurities are more electropositive than

Art Unit: 1793

zinc and are strongly detrimental to subsequent electrolysis of zinc (p. 18, col. 1, para 2).

Regarding claims 8 and 9, it would have been obvious to one of ordinary skill in hydrometallurgy, at the time the invention was made, taking the disclosures of Davister, Fugleberg, Reinhardt, and Graf, as a whole, to feed oxygen / air into the neutral leaching stage to oxidize the ferrous iron and precipitate it as hydroxide along with harmful minerals in the solution as Graf teaches that antimony and germanium contents harm subsequent electrolysis to recover zinc and that precipitating iron hydroxide will co-precipitate impurities for removal. Reinhardt adds that divalent ions should be oxidized by blowing oxygen / air into the neutral leaching step to form trivalent ions so iron hydroxide forms.

### ***Conclusion***

**-- Claims 1-14 (All pending) are rejected**

**-- No claims are allowed**

The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-

Art Unit: 1793

3588. The examiner can normally be reached on Monday - Thursday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

**/Mark L. Shevin/**

**/Roy King/**

**Supervisory Patent Examiner, Art Unit 1793**

10-544,272  
May 16<sup>th</sup>, 2008